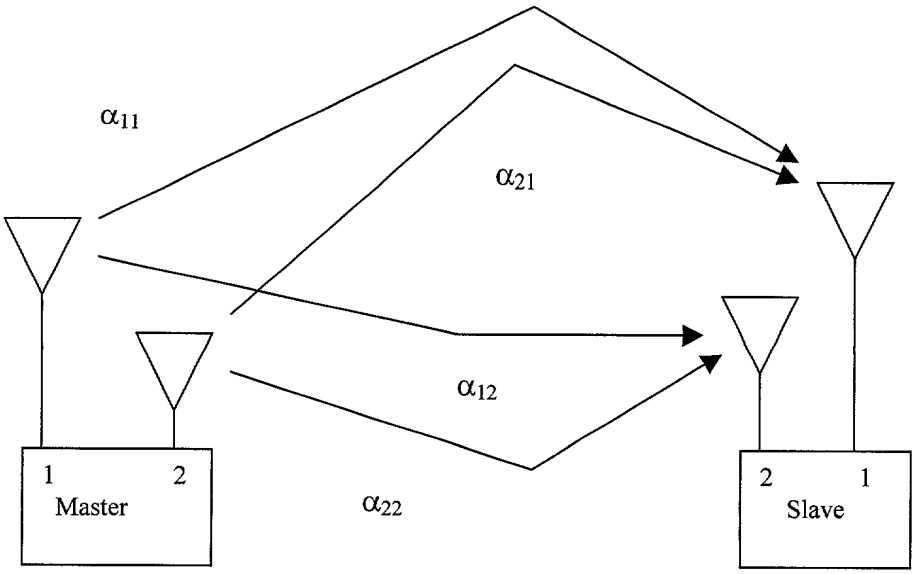
Figure 1



downlink

Figure 2

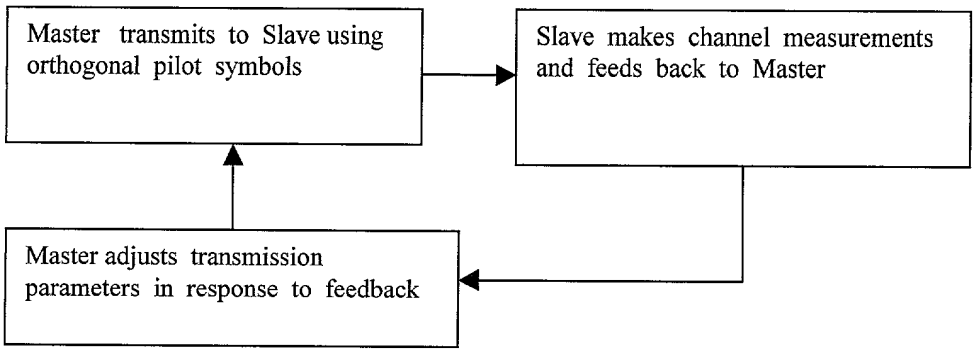
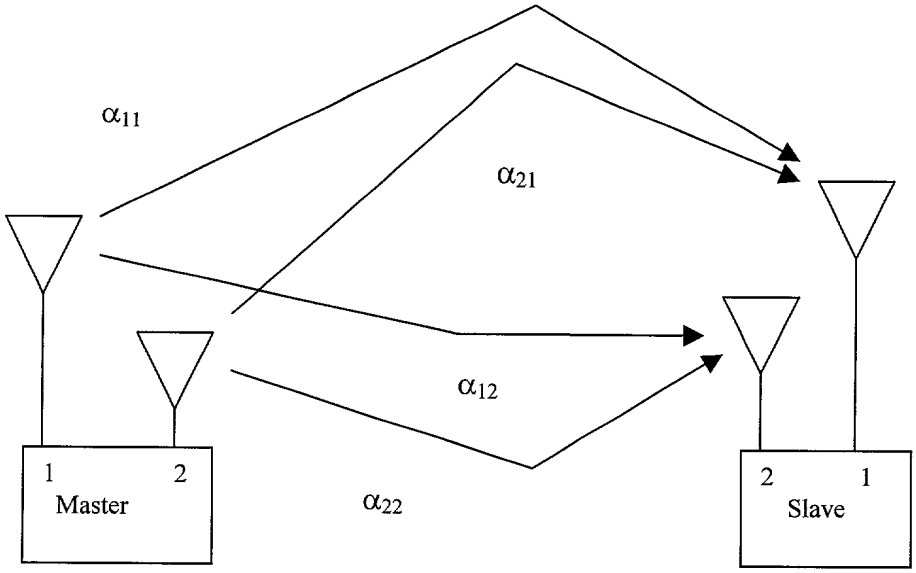
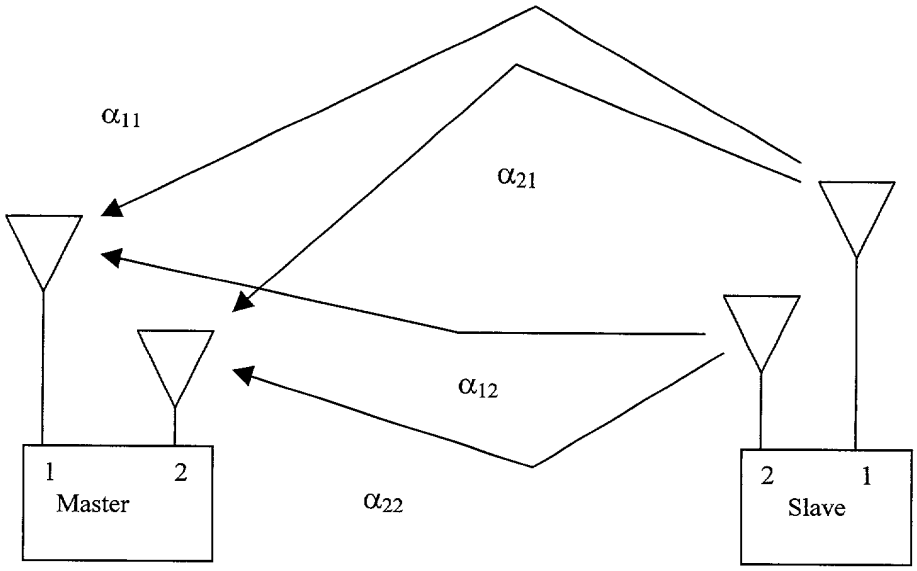

Master transmits to Slave using orthogonal pilot symbols
Slave makes channel measurements and feeds back to Master
Master adjusts transmission parameters in response to feedback

Figure 3



downlink



uplink

Figure 4

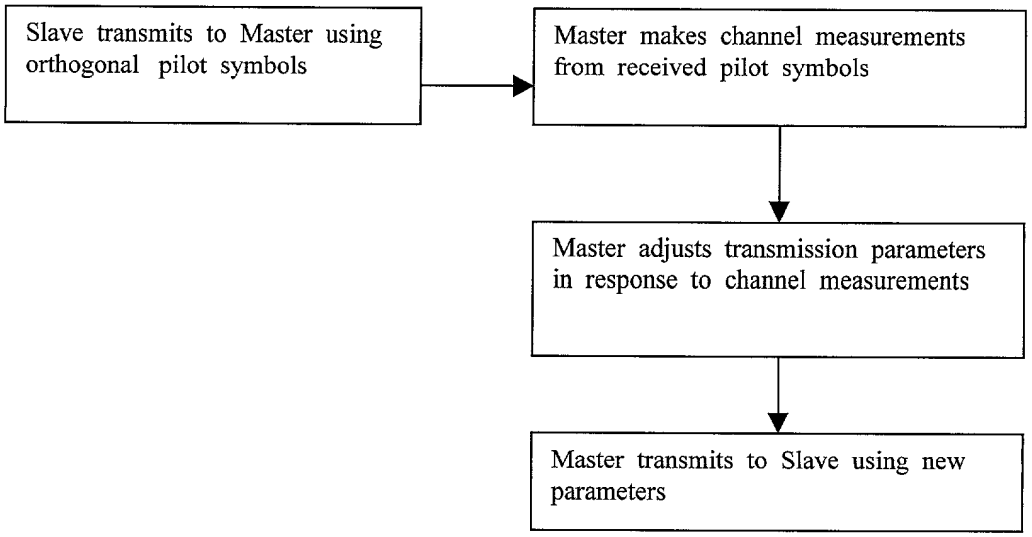

Slave transmits to Master using orthogonal pilot symbols
Master makes channel measurements from received pilot symbols
Master adjusts transmission parameters in response to channel measurements
Master transmits to Slave using new parameters

Figure 5

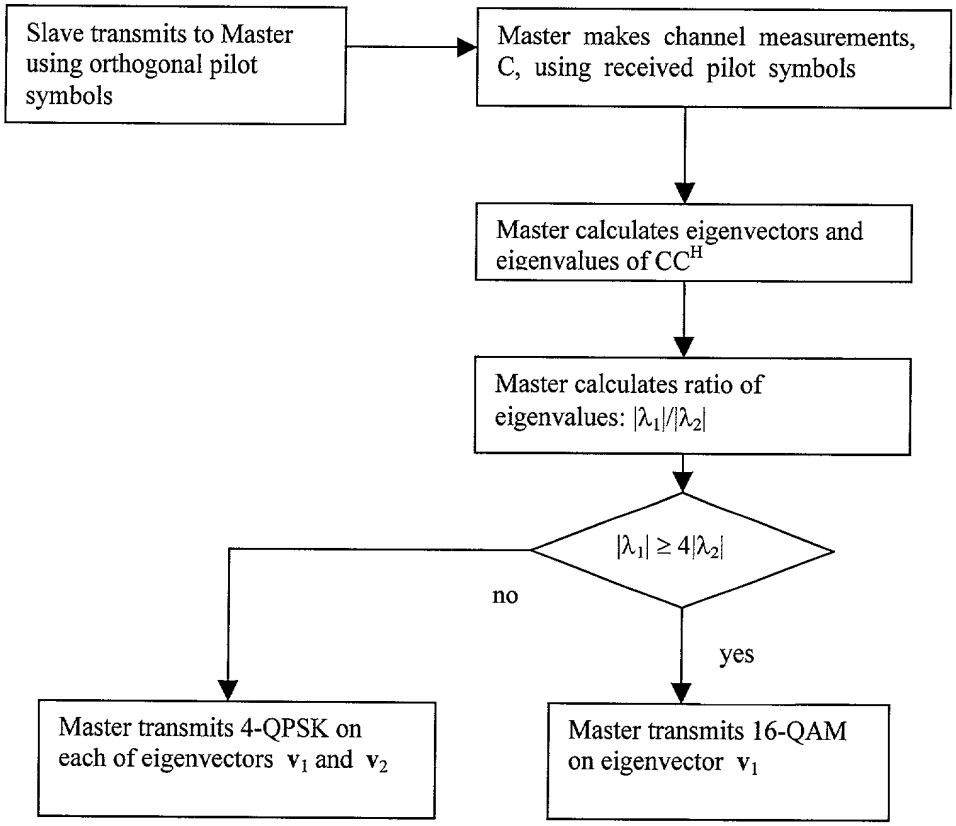
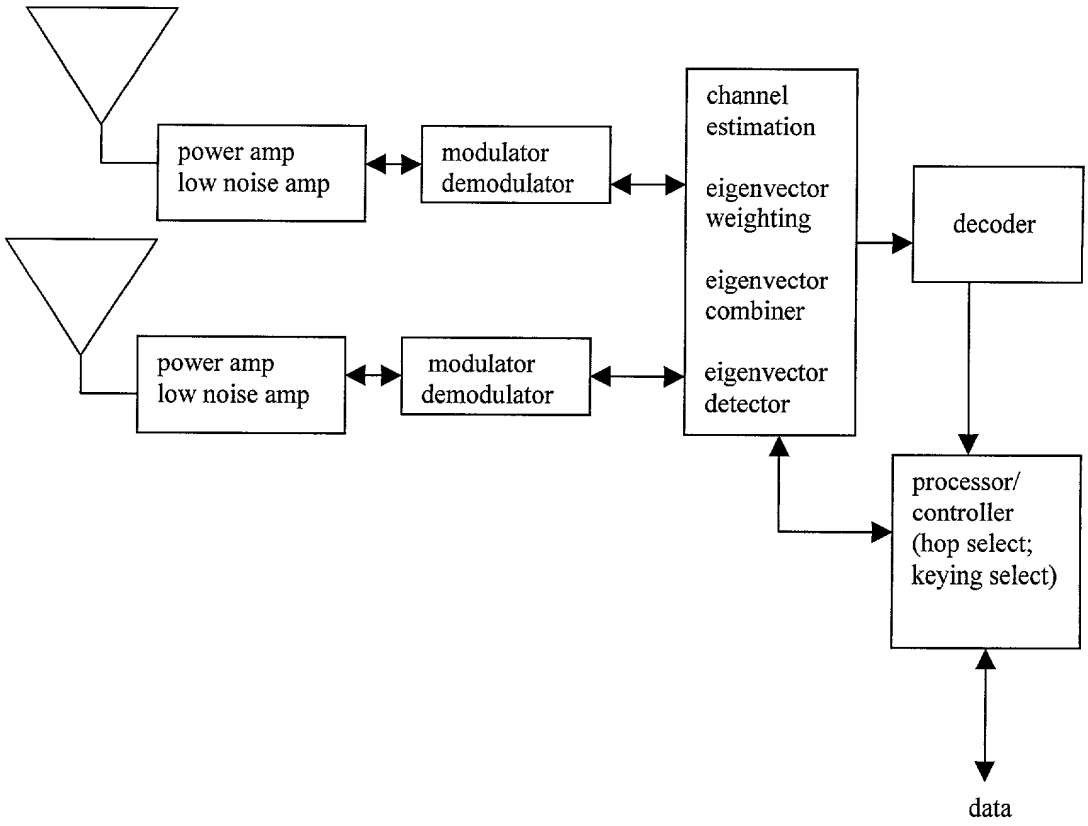

Slave transmits to Master using orthogonal pilot symbols
Master makes channel measurements, C, using received pilot symbols
Master calculates eigenvectors and eigenvalues of CC^H
Master calculates ratio of eigenvalues: $|\lambda_1|/|\lambda_2|$
$|\lambda_1| \geq 4|\lambda_2|$
no
yes
Master transmits 4-QPSK on each of eigenvectors $\mathbf{v}_1$ and $\mathbf{v}_2$
Master transmits 16-QAM on eigenvector $\mathbf{v}_1$

Figure 6


power amp
low noise amp
modulator
demodulator
channel
estimation
eigenvector
weighting
eigenvector
combiner
eigenvector
detector
decoder
power amp
low noise amp
modulator
demodulator
processor/
controller
(hop select;
keying select)
data